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Insecticide resistance management for soybean aphid

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Pest resistance to insecticides threatens to reduce the already relatively short list of insecticide groups (modes of action) available for management of certain pests and can result in increased production costs. Foliar application of broad-spectrum insecticides is currently the primary tactic for suppression of soybean aphid outbreaks; however, repeated use of insecticides can result in pests developing resistance to insecticides. This presentation will provide an overview of recent research from Minnesota to monitor for insecticide resistance in soybean aphid populations. Insecticide resistance management strategies will also be reviewed in the context of soybean aphid management. To complement this presentation, excerpts from "Insecticide Resistance Management in Soybean," a University of Minnesota factsheet by Koch, MacRae and Potter (2013) are included here.

Resistance

Insecticide resistance is a heritable decrease in a pest population's susceptibility to a pesticide, meaning the genetics are passed from generation to generation. As pest populations become less susceptible (i.e., more resistant) to a pesticide, the utility of that pesticide becomes less and less effective to a point where the pesticide and potentially other related pesticides may become effectively lost as tools for management of that pest.

Insecticide resistance management

Insecticide resistance management (IRM) is a collection of strategies used to prevent or slow the development of resistance to insecticides in order to prolong the utility of pesticides as management tools.

IRM strategies recommended for insect and mite pests in soybean include the following:

1) Reduce likelihood of needing to use insecticides.

Integrate multiple management tactics (e.g., pest-resistant varieties, biological control, crop rotation) to discourage pest outbreaks.

2) Use insecticides only when necessary.

Scout regularly and base insecticide applications on economic (action) thresholds. High crop values can drive increased prophylactic (insurance) use of insecticides. Such use can lead to resurgence of the target pest, replacement by secondary pests, adverse impacts on natural enemies and pollinators, development of pest resistance, and increased costs.

3) Use insecticides appropriately.

Follow the product label directions and use labeled rates of insecticides.

4) Don't repeat use of the same insecticide mode of action.

Alternate insecticide modes of action (Groups) to delay resistance. For newer products, the insecticide group is listed on the label. Though insecticide mixtures (formulated mixtures or tank mixtures) may be effective for pest suppression, alternation (i.e., the use one after another) of insecticide modes of action is generally more effective for insecticide resistance management.

Identifying cases of potential resistance

Before assuming resistance, rule out these factors:

1. Misapplication of insecticide (incorrect insecticide or rate, poor coverage)
2. Unfavorable weather (wind, rain, temperature) (for example, some pyrethroids can be less effective at high temperatures)
3. Improper timing of application (susceptibility of life stage present)
4. Recolonization by the pest